Original article

CLINICAL AND EXPERIMENTAL VACCINE RESEARCH

In silico analysis of *Brucella abortus* Omp2b and *in vitro* expression of SOmp2b

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Purpose: At present, there is no vaccine available for the prevention of human brucellosis. *Brucella* outer membrane protein 2b (Omp2b) is a 36 kD porin existed in common *Brucella* pathogens and it is considered as priority antigen for designing a new subunit vaccine.
Materials and Methods: In the current study, we aimed to predict and analyze the secondary and tertiary structures of the *Brucella abortus* Omp2b protein, and to predict T-cell and B-cell epitopes with the help of bioinformatics tools. Subsequently, cloning and expression of the short form of Omp2b (SOmp2b) was performed using pET28a expression vector and *Escherichia coli* BL21 host, respectively. The recombinant SOmp2b (rSOmp2b) was purified with Ni-NTA column.
Results: The recombinant protein was successfully expressed in *E. coli* host and purified under denaturation conditions. The yield of the purified rSOmp2b was estimated by Bradford method and found to be 220 μg/mL of the culture.
Conclusion: Our results indicate that Omp2b protein has a potential to induce both B-cell– and T-cell–mediated immune responses and it can be evaluated as a new subunit vaccine candidate against brucellosis.

Keywords: *Brucella*, Omp2b, *In silico* approach, Epitope prediction, Protein expression

Introduction

Brucellosis is an important zoonotic disease caused by gram-negative facultative intracellular *Brucella* [1]. According to zoonotic potential and primary host preference, the genus of *Brucella* is classified into nine species: *Brucella melitensis* (sheep and goats), *Brucella suis* (hogs), *Brucella abortus* (cattle), *Brucella ovis* (sheep), *Brucella canis* (dogs), *Brucella neotomae* (rats), *Brucella ceti* (cetaceans) and *Brucella pinnipedialis* (seals), and *Brucella microti* (common vales) [2]. The zoonotic potential of *B. melitensis, B. abortus*, and *B. suis* are considered high and they are most human pathogens [3]. Annually, worldwide incidence of brucellosis is more than 500,000 human infections. Although the disease has a restricted geographic distribution, but it still remains major public health challenge in the Mediterranean region, Asia, Africa, and Latin America. Animal brucellosis causes vast economic losses due to abortion, reproductive failure, and decreased milk production [4,5]. Among different control measures for the eradication of brucellosis, vaccination is indicated to be the most economic measure for control of the disease in endemic areas [6]. For the development of an effective vaccine, it is nec-